



IT313 - Software Engineering Parking Management System

Group No. 29
Non-Functional Testing

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Non-Functional Testing

Non-functional testing for the Parking Management Project focuses on evaluating aspects of the system that are not directly related to specific functionalities but are critical for its overall performance, reliability, and user experience.

This testing approach checks parameters such as system responsiveness, scalability, security measures, usability, and resilience under varied conditions. By examining these non-functional attributes, the testing process aims to fortify the system's robustness and optimise its capabilities to meet or exceed user expectations.

Non-functional requirements-

1. **Performance:**

The system should respond promptly to user queries, such as availability of parking spots, booking confirmations, and payment processing.

2. **Reliability:**

Ensure high system uptime and reliable data management to avoid disruptions in parking space reservations, entry/exit systems, and payment handling.

3. **Scalability:**

The system should be capable of handling an increasing number of users, vehicles, and parking lots as the platform expands.

4. **Usability:**

The interface should be intuitive and user-friendly for drivers, parking lot managers, and administrators, ensuring smooth interaction and minimal learning curve.

5. **Mobile Accessibility:**

Ensure that the system is fully functional and optimized for mobile devices, allowing users to locate, book, and pay for parking conveniently.

Objectives-

1. Non-Functional Testing enhances the configuration, execution, management, and app/website monitoring.
2. It enhances the usability, effectiveness, maintainability, and portability of the app/website.
3. It also helps in improving the user experience.

Usability Testing: This type of testing evaluates how easy it is to use the software system, including its interface and design. It includes testing for user experience, accessibility, and internationalization.

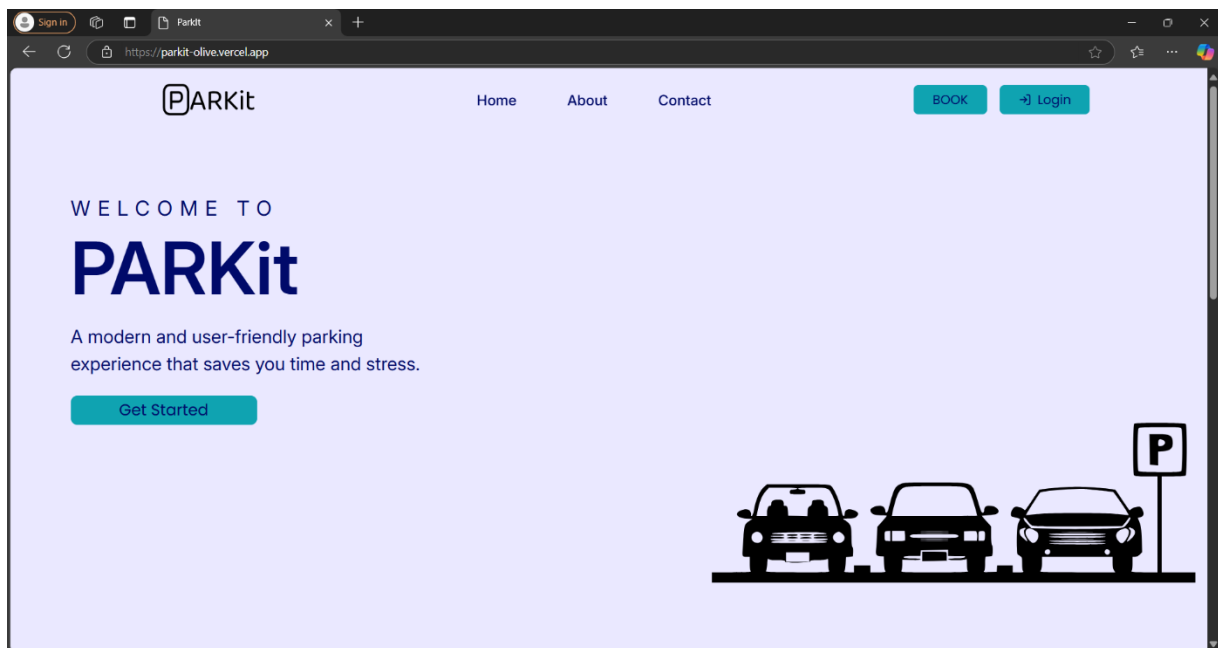
And as you can see in GUI testing and acceptance testing our website is easy to use cause of the good interface.

Compatibility Check: We have ensured that the portal runs on all the latest web browsers including Edge, Chrome, and Brave. We have also ensured that it is compatible on all devices. We have also ensured that is compatible in all operating system like Windows, macOS.

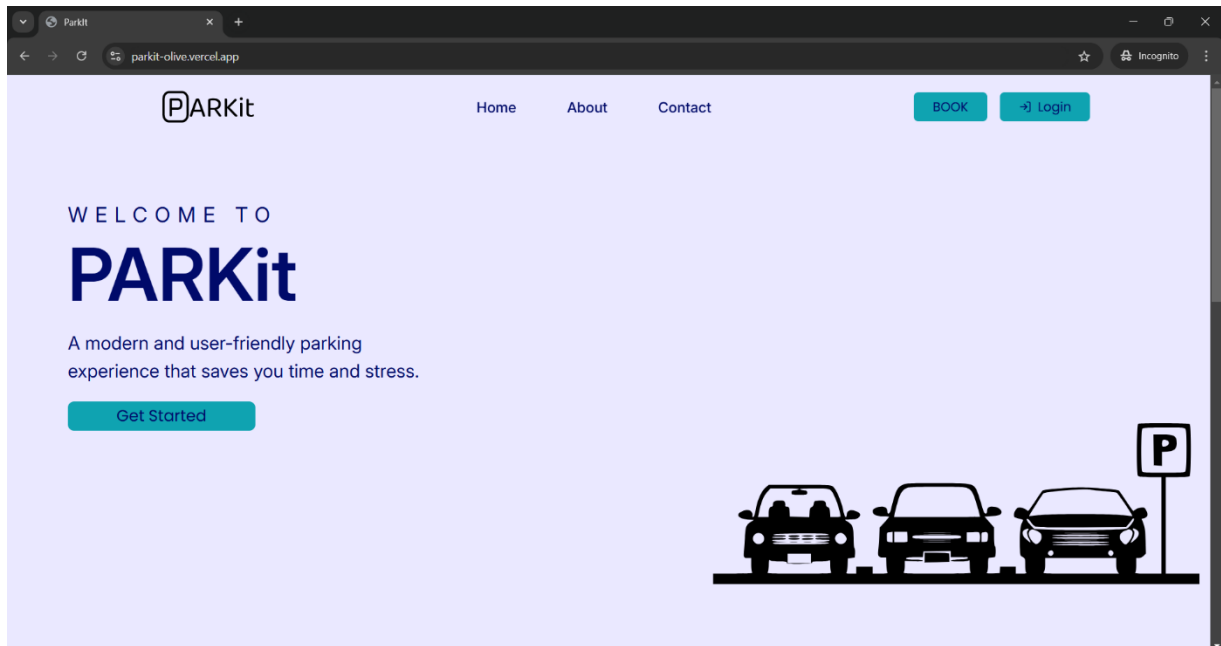
COMPATIBILITY CHECK

1) Browser Compatibility

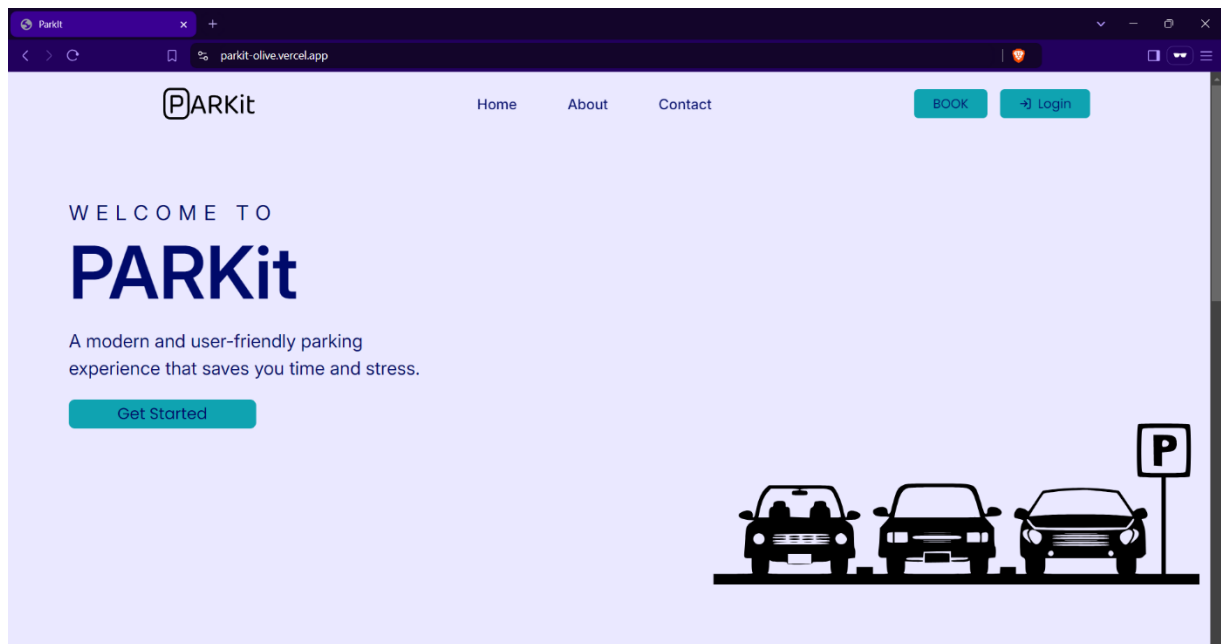
Microsoft Edge:



Chrome:

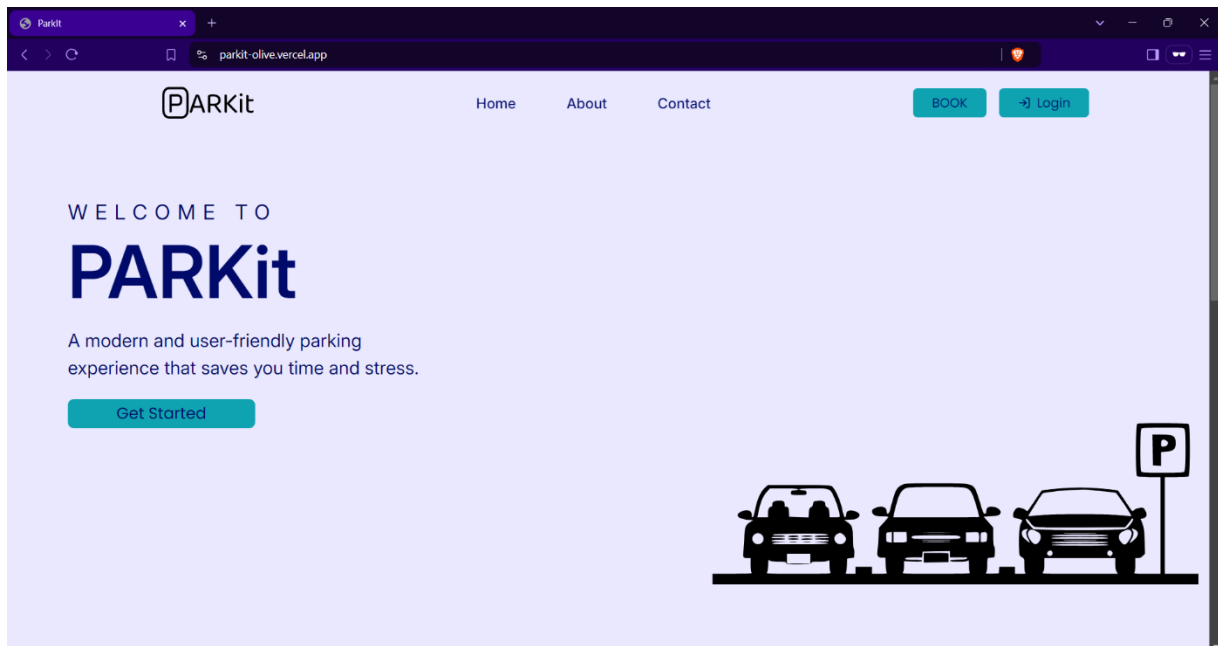


Brave:

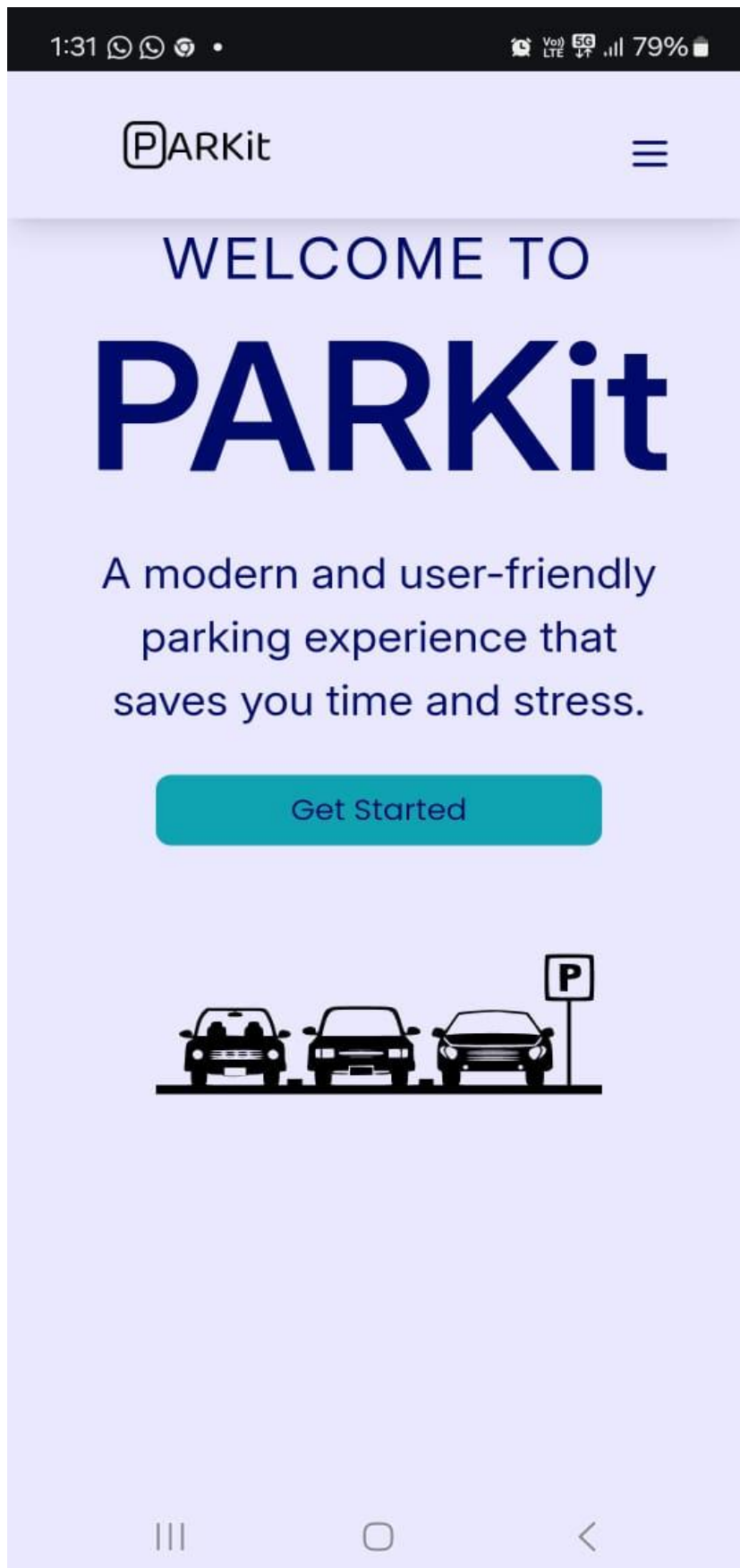


2) Device Compatibility

PC:

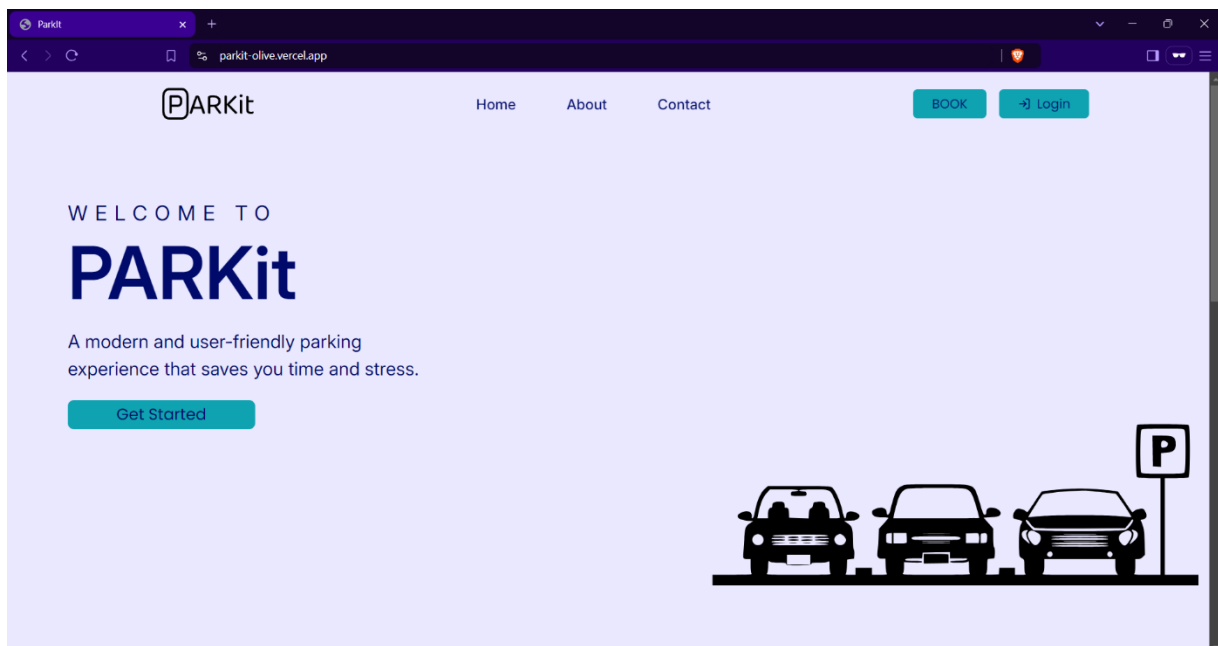


Mobile Phone:

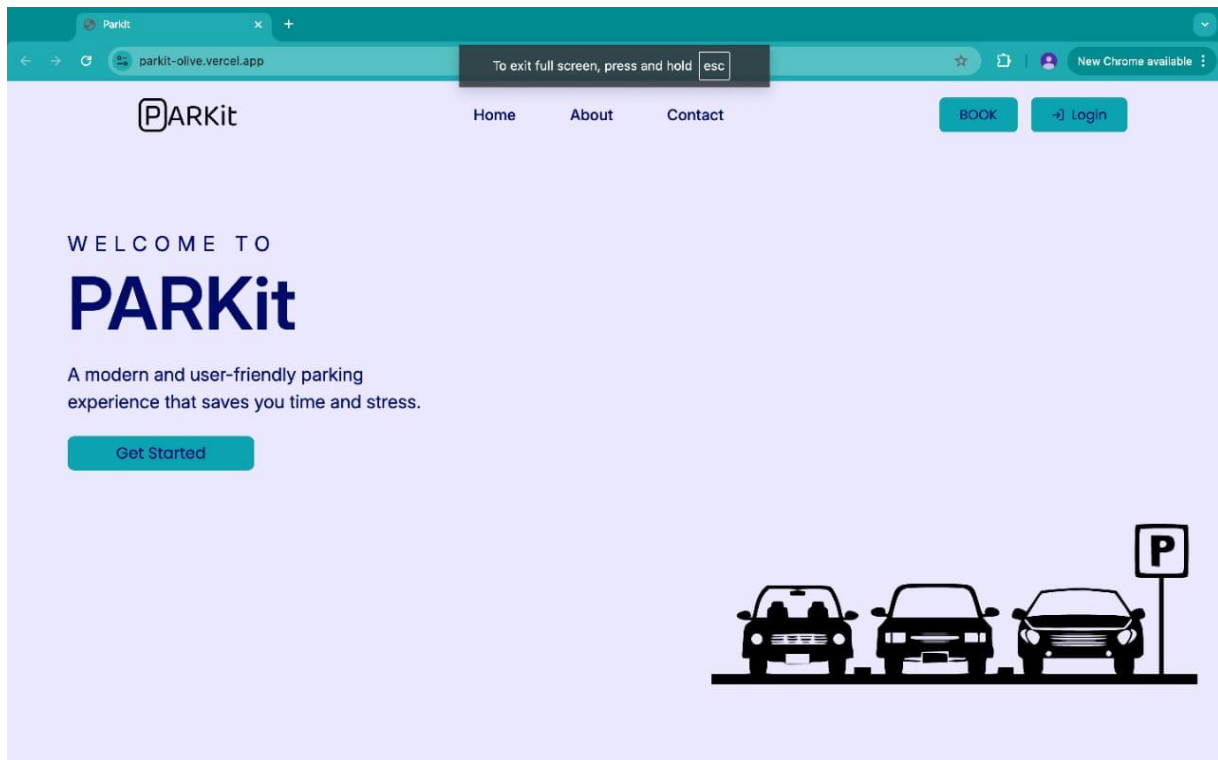


3) Operating System Compatibility

Windows:



MacOS:



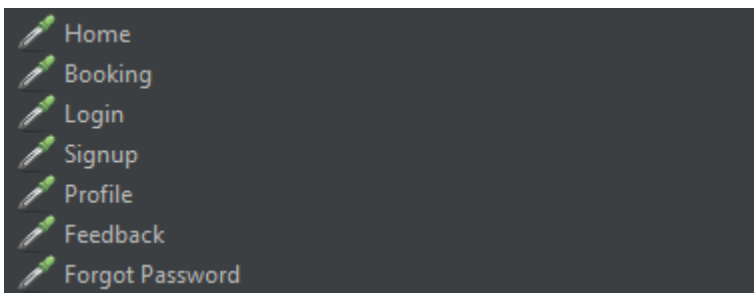
LOAD TESTING

Implemented load testing to evaluate the system's performance under various levels of concurrent user activity. Assessed system scalability, response time, and reliability to ensure optimal functionality under peak load conditions.

We have Done Load Testing on APACHE JMeter. We have initialised our thread group as:

The screenshot shows the configuration for a Thread Group in Apache JMeter. The Name is 'Thread Group'. The Action to be taken after a Sampler error is set to 'Continue'. The Thread Properties section shows: Number of Threads (users) is 300, Ramp-up period (seconds) is 20, Loop Count is 10 (with 'Infinite' unchecked), 'Same user on each iteration' is checked, 'Delay Thread creation until needed' is unchecked, and 'Specify Thread lifetime' is unchecked. The Duration (seconds) and Startup delay (seconds) fields are empty.

We have done on 7 different web pages



1) Summary Report

Summary Report

Name:Summary Report

Comments:

Write results to file / Read from file

Filename

Browse...

Log/Display Only:

☐Errors

☐Successes

Configure

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
Home	3000	29	15	336	20.97	0.00%	135.8/sec	157.34	16.98	1186.0
Booking	3000	23	15	173	8.93	0.00%	136.7/sec	158.34	18.02	1186.0
Login	3000	23	15	279	9.69	0.00%	136.6/sec	158.23	17.74	1186.0
Signup	3000	23	15	576	13.82	0.00%	135.9/sec	157.41	17.78	1186.0
Profile	3000	23	15	144	8.14	0.00%	136.5/sec	158.11	18.00	1186.0
Feedback	3000	23	15	133	8.01	0.00%	136.4/sec	157.99	18.12	1186.0
Forgot Password	3000	23	15	120	8.27	0.00%	136.3/sec	157.89	19.04	1186.0
TOTAL	21000	24	15	576	12.14	0.00%	935.4/sec	1083.40	123.19	1186.0

2) View Results Tree

View Results Tree

Name:View Results Tree

Comments:

Write results to file / Read from file

Filename

Browse...

Log/Display Only:ErrorsSuccessesConfigure

Search

Case sensitiveRegular expSearchReset

Text

Sampler result

Signup

Forgot Password

Signup

Feedback

Booking

Home

Feedback

Home

Booking

Home

Signup

Feedback

Signup

Home

Forgot Password

Home

Profile

Forgot Password

Home

Home

Login

Profile

Forgot Password

Forgot Password

Login

Booking

Profile

Profile

Booking

Booking

Feedback

Home

Booking

3) View Results in Table

View Results in Table

Name:View Results in Table

Comments:

Write results to file / Read from file

Filename

Browse...

Log/Display Only:ErrorsSuccessesConfigure

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	13:20:46.428	Thread Group 1-3	Home	75		1186	128	75	49
2	13:20:46.204	Thread Group 1-1	Home	217		1186	128	217	185
3	13:20:46.359	Thread Group 1-2	Home	154		1186	128	154	129
4	13:20:46.511	Thread Group 1-1	Booking	26		1186	135	26	0
5	13:20:46.506	Thread Group 1-3	Booking	33		1186	135	33	0
6	13:20:46.513	Thread Group 1-2	Booking	31		1186	135	31	0
7	13:20:46.537	Thread Group 1-1	Login	24		1186	133	24	0
8	13:20:46.540	Thread Group 1-3	Login	24		1186	133	24	0
9	13:20:46.544	Thread Group 1-2	Login	26		1186	133	26	0
10	13:20:46.493	Thread Group 1-4	Home	200		1186	128	200	61
11	13:20:46.570	Thread Group 1-2	Signup	123		1186	134	123	0
12	13:20:46.562	Thread Group 1-1	Signup	131		1186	134	131	0
13	13:20:46.564	Thread Group 1-3	Signup	129		1186	134	129	0
14	13:20:46.694	Thread Group 1-3	Profile	20		1186	135	20	0
15	13:20:46.694	Thread Group 1-1	Profile	24		1186	135	24	0
16	13:20:46.694	Thread Group 1-2	Profile	26		1186	135	26	0
17	13:20:46.694	Thread Group 1-4	Booking	26		1186	135	26	0
18	13:20:46.563	Thread Group 1-5	Home	165		1186	128	165	138
19	13:20:46.714	Thread Group 1-3	Feedback	23		1186	136	23	0
20	13:20:46.718	Thread Group 1-1	Feedback	24		1186	136	24	0
21	13:20:46.720	Thread Group 1-2	Feedback	24		1186	136	24	0
22	13:20:46.720	Thread Group 1-4	Login	26		1186	133	26	0
23	13:20:46.728	Thread Group 1-5	Booking	20		1186	135	20	0
24	13:20:46.695	Thread Group 1-7	Home	61		1186	128	61	43
25	13:20:46.737	Thread Group 1-3	Forgot Password	19		1186	143	19	0
26	13:20:46.742	Thread Group 1-1	Forgot Password	26		1186	143	26	0
27	13:20:46.748	Thread Group 1-5	Login	23		1186	133	23	0
28	13:20:46.756	Thread Group 1-3	Home	18		1186	128	18	0
29	13:20:46.745	Thread Group 1-2	Forgot Password	29		1186	143	29	0
30	13:20:46.756	Thread Group 1-7	Booking	19		1186	135	19	0
31	13:20:46.746	Thread Group 1-4	Signup	31		1186	134	31	0
32	13:20:46.774	Thread Group 1-3	Booking	18		1186	135	18	0
33	13:20:46.771	Thread Group 1-5	Signup	21		1186	134	21	0
34	13:20:46.628	Thread Group 1-6	Home	164		1186	128	164	130

☐ Scroll automatically?

☐ Child samples?

No of Samples:21000

Latest Sample:37

Average:24

Deviation:12